National Aeronautics and Space Administration

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New Hall thruster passes performance testing

Glenn news release

Glenn researchers have successfully tested a new thruster that could make it easier and more cost effective to study our solar system.

The test involved a Hall thruster built under the High Voltage Hall Accelerator (HiVHAC) project. The HiVHAC thruster was designed and fabricated over the last year by a team from Glenn and Aerojet of Redmond, WA, to operate efficiently over a wide range of input power levels.

The HiVHAC thruster was tested in Glenn's Electric Propulsion Laboratory, Vacuum Facility 12, which simulates the vacuum environment of space. The thruster operated successfully with input powers between 200 and 2900 watts at specific impulses (a measure of propellant fuel economy) between 1000 and 2800 seconds.

The prototype High Voltage Hall thruster was developed by Glenn and the Aerojet Corporation.

"This thruster has met all of our initial objectives," said Dave Manzella, HiVHAC principle investigator, Electric Propulsion Branch. "It has great potential to open the door to using solar electric propulsion in deep space without adding significant weight or cost to the mission. Not only will it operate efficiently with a range of input powers but it is also significantly lighter, under 3 kilograms, and has fewer components than state-of-the-art technologies."

Hall thrusters generate thrust by accelerating electrically charged gas particles (ions). Ejecting these particles at high velocities in a focused direction pushes the spacecraft ahead. This propulsion technology will utilize the Sun for its power. Solar energy for a given area decreases with distance from the Sun. Low-power operation is therefore important because it allows spacecraft to continue thrusting in space far from the sun, where there is little solar power available to be absorbed by a craft's solar arrays.

The thrust generated by this propulsion technology is much smaller than currently used chemical alternatives. It is comparable to the force exerted by a sheet of paper resting

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New Center Director named

NASA Administrator Michael Griffin has named Dr. Woodrow Whitlow, Jr., the next director of NASA Glenn. Whitlow, who has been serving as deputy director of Kennedy Space Center, succeeds Dr. Julian Earls, who is retiring at the end of the year.

Dr. Whitlow

Whitlow returns to Glenn where he served as director of Research and Technology for 5 years prior to his appointment to NASA Kennedy in 2003. He joined the U.S. space program in 1979 as a research scientist at Langley Research Center. He also has served as director of the Critical Technologies Division of the Office of Aeronautics at NASA Headquarters and as deputy director of the Aeronautics Program Group, deputy director of the Airframe Systems Program Office, and chief of the Structures Division at NASA Langley. ◆

Inside

Research Highlights

The following are a few recent Research and Technology Directorate milestones.

Flexible thin film heat flux sensors advanced

The Goodyear Tire & Rubber Company recently took delivery of 15 thin film heat flux sensors designed by members of the Sensors and Electronics Branch and fabricated at Glenn in the Building 77 clean room. These sensors, which measure 1/4-inch square, are small enough to be mounted within the tread of a passenger car tire and will be used to measure tread temperature and transient heat flux inside and outside the tread during dynamometer testing. The sensors consist of a thin film of platinum with half of a Wheatstone bridge on each side of a film substrate. The substrate itself consists of 0.01-inch-thick Mylar, enabling a flexible sensor that can bend with the tire as it rolls. Knowledge gained in developing this flexible film sensor technology is applicable to the next generation of space suits under development. (Point of contact: Gustave Fralick, 3–3645)

Glenn heat flux sensor inserted in Goodyear tire.

Intelligent retrofit architecture for engine control

As part of the Propulsion 21 project, Glenn is developing a retrofit architecture for intelligent turbofan engine control and diagnostics that changes the outer-loop fan speed reference signal to accommodate the fan speed to thrust relationship. The typical engine inner-loop control architecture uses fuel flow to control fan speed, which is assumed to be correlated to engine thrust. As an engine ages, the relationship between fan speed and thrust changes, altering the thrust response to throttle input. If all engines on a multi-engine aircraft do not have the same throttle-to-thrust relationship, it can result in thrust asymmetry, producing unwanted yaw, which requires pilot intervention to correct. The intelligent retrofit architecture successfully accommodated a thrust imbalance on a commercial aircraft engine simulation in straight and level flight fixed-base piloted flight simulator. This effort completes an interim deliverable under the Adaptive Control element of the Propulsion 21 project. (Point of contact: Jonathan Litt, 3–3748).

Litt at the engine control evaluation station

Large Water Droplet Splash Dynamics Investigation

Glenn's Icing Branch and Wichita State University are collaborating on an effort to visualize the splashing and breakup of large water drops on a simulated airfoil with ice for a better understanding of the droplet splash/breakup process for improved ice prediction computer codes. Wichita State University designed the specialized inlet and airfoil for a small wind tunnel facility in the Engine Research Building test cell CW-5A, outfitted to support this experimental investigation. This inlet was installed and initial flow quality and pressure instrumentation checks completed for the initial tests. A monodispersed droplet generator shot a stream of large water droplets (100 to 300 µm) at an airfoil with simulated ice accretion on the leading edge. A high-speed imaging system was used to successfully capture and record the trajectory of the incoming droplets on approach as well as the impact to the surface of the airfoil. NASA's Aviation Safety and Security Office supports this activity. (Point of contact: Dean Miller, 3–5349).

Laser beam imaging captures water droplets on airfoil.

e-Training initiative consolidates systems

SATERN—the System for Administration, Training, and Educational Resources for NASA—is an Agencywide e-Training effort now being implemented in a three-phased approach at each center. As an e-Government initiative, SATERN supports the President's Management Agenda for improving the Government's responsiveness to citizens and efficiency of operations. As such, NASA, as well as all Federal agencies, is required by the Office of Management and Budget and the Office of Personnel Management to participate in this initiative.

SATERN is expected to improve Agency services and save taxpayer dollars by consolidating NASA's multiple learning systems: AdminSTAR—the training administration system, Site for On-line Learning and Resources (SOLAR)—the online custom content software, and NASA Online Registration System (NORS)—the automated registration and tracking system currently in use at NASA Marshall and NASA Kennedy.

SATERN will provide all NASA employees with easy-to-use, one-stop, online access to training information. The system will enable employees to view course catalogs directly from their desktops, enroll in courses, schedule training, and view their individual training history. In addition, employees can launch online courses and access customized and commercial-off-the-shelf (COTS) e-learning opportunities through SATERN.

"In addition to simplifying processes for NASA employees, the training and development community will benefit from SATERN's centralized and automated approach to learning management," said Cynthia Forman, chief of Glenn's Organization Development and Training Office. "Over time, the system will standardize processes, create efficiencies, and improve integration by providing new tools, functionality, and capabilities for career development and training administration."

For further information, contact Nola Bland, 3–9343, or Natalie Pastorin, 3–2234, or visit http://cfo.grc.nasa.gov/ifm/etraining/etraining.asp. ◆

Dr. Shyne and Sanabria receive new appointments

Dr. Shyne

Sanabria

Dr. Rickey Shyne, former deputy director of Safety and Mission Assurance, was appointed to the Senior Executive Service. Effective August 21, Shyne became deputy director of the Engineering & Technical Services Directorate. Rafael Sanabria has been appointed to replace Shyne in Safety and Mission Assurance.

Highly regarded for his aeronautical propulsion expertise, Shyne brings to the position significant experience on technical and programmatic issues concerning other NASA centers, the Department of Defense, industry, and academia.

During more than 21 years of NASA service, Shyne has gained extensive experience as a researcher, project manager, and manager of computational and experimental research for aeronautics and space propulsion systems. More recently, he shared oversight of Glenn's safety and mission assurance functions including risk, quality, safety, and environmental management for both institutional and flight programs.

Sanabria formerly served as chief of the Computational Environments Branch, where he managed high-performance computing resources of the Research Analysis Center and the Escort Data Acquisition Systems at Glenn's research facilities.

Since joining NASA nearly 26 years ago, Sanabria has amassed extensive experience in fluid and thermal analysis for ground and space-based systems, project management, information technologies services, and supervision. In addition, he recently completed an assignment as a member of the NASA Shared Services Center Source Evaluation Board at NASA Headquarters. ◆

Hurricane assistance

Thanks to the NASA Family Assistance Fund and the Combined Federal Campaign, anyone can provide financial assistance to those inside and out of the Agency who were affected by hurricane Katrina–all with the click of a mouse. See NASA's public Web site at www. nasa.gov/eoc for more information.

Dr. Lebacqz visits Glenn

Center Director Dr. Julian Earls, left, presents Dr. Lebaczq with a framed photograph of NASA Glenn.

C-2005-1258 Photo by Marvin Smith

During his visit to the Center on September 1, Dr. J. Victor Lebacqz, NASA Associate Administrator for Aeronautics, thanked Glenn employees for their support and hard work. In addition to answering questions from employees, Lebacqz reflected on his previous visits to Glenn and stressed the value he holds for the NASA family.

Thruster could make solar system travel easier, cost effective

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on the palm of your hand. However, unlike chemical systems that may only burn for a few minutes, a solar electric propulsion engine can thrust continuously for years. Using this propulsion technology, velocities more than 10 times those possible with chemical systems can be achieved by spacecraft accelerating over a long period of time.

"We believe that the HiVHAC thruster will be an invaluable part of future planetary missions," said Tibor Kremic, Glenn's In-Space Propulsion program manager, Science Division. "While there is more work to be done before this technology is ready to fly, we are already excited about the performance and cost benefits being projected."

The next step for this technology will be to design and demonstrate the thruster's ability to achieve the long life necessary to reach outer destinations. The flight subsystems that support the thruster, such as the power-processing unit, will also need to be developed.

The HiVHAC thruster was developed through the In-Space Propulsion (ISP) technology development program. Marshall Space Flight Center manages ISP on behalf of NASA's Science Mission Directorate. ◆

News and Events

Math and science focus

Photo by Doreen Zudell

Glenn's Educational Programs Office (EPO) and some of its partners in the Science and Mathematics Achievement Required for Tomorrow (SMART) Consortium and Ohio Math and Science Coalition met with leadership from the Ohio Department of Education (ODE) to discuss strategies to improve math and science education for Ohio's K through 12-grade students. Pictured, seated from left: Debbie Roshto, associate director, Science, ODE; Jane Ensign, director, Curriculum and Instruction, ODE; Jim Fitzgerald, aerospace education specialist, NASA AESP; Jo Ann Charleston, chief, EPO; and Joan Leitzel, associate director, Math Initiatives, ODE. Pictured, standing from left: John Hairston, director, External Programs; George Viebranz, executive director, Ohio Math and Science Coalition; Rob LaSalvia educational programs specialist, EPO; and Terry Krivak, executive director, SMART Consortium.

Photo by Glenn Exhibits Team

AirVenture 2005

NASA's largest annual aeronautics exhibit was a great success at the Experimental Aircraft Association "AirVenture 2005" held in Oshkosh, WI, this summer. Nearly 700,000 air and space enthusiasts attended. Pictured behind the desk, back to front, Chris Conrad (Army), Bob Everett, and Tracy Cantley, Prototype Development Branch, demonstrating the Rapid Prototyping machine at the Craftsmanship booth.

Global security

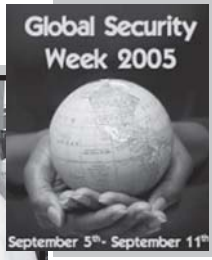

Photo by S. Jenise Veris

Glenn joined organizations worldwide that observed the first Global Security Week, held the week of the September 11 anniversary, with activities designed to raise security awareness. Glenn's IT Security Awareness and Training Center sponsored activities focused on the topic of Identity Theft. Pictured, left to right, are ODIN representatives Stan Kusper and George Milbrandt LMIT/ Information Systems Division, with Alecia Evar, SGTI/IT Security Awareness and Training Center, who coordinated the installation of the latest version of anti-virus software on Government laptop computers.

Photo by S. Jenise Veris

Tech Expo

Twenty-two companies set up exhibits demonstrating the latest products and/or technology in mobile computing systems, imaging solutions, data storage, and more during the Technology Expo held August 25 at OAI. More than 290 employees interacted with vendors and enjoyed complimentary giveaways and refreshments. Pictured: Richard Hood, Carl Zeiss MicroImaging, Inc., assists Al Juhasz, Thermal Energy Conversion Branch, in a stereomicroscope demonstration.

Photo by Doreen Zudell

Thunderbirds land

The U.S. Air Force Thunderbirds were in town Labor Day weekend for the Cleveland Air Show. On September 2, employees were invited to get a close-up view of the Thunderbird airplanes, which were parked on Glenn's tarp. The Thunderbirds support U.S. Air Force recruiting and retention programs, reinforce public confidence in the U.S. Air Force, and project international goodwill.

Center Director's Message

Emerging strong through transition

Dr. Earls

This message is one of transition. As I plan to retire from NASA after over 40 years, I will remember you, my colleagues, with respect and admiration. Through your efforts and involvement, NASA Glenn Research Center (GRC) has strengthened networks and partnerships to solidify our future. These collaborations are with universities, community organizations, business, industry, other Federal agencies, and other NASA centers. In addition, we can take pride in the confidence shown by local, state, and Federal legislators in our ability to serve NASA and the Nation. The Ohio delegation has been steadfast in support and advocacy for GRC.

Our role in the future of NASA is secure. Without question, we will be smaller in number. However, we will emerge from this transition stronger due to our competencies and contributions. NASA Administrator Mike Griffin has stated he wants ten healthy NASA centers. His actions validate his resolve to make that a reality. There are many questions yet to be answered. I leave a team in place capable of providing those answers. Under the able Center leadership of your new Center Director, Dr. Woodrow Whitlow, GRC will have a critical role in the mission of NASA. Woodrow's background and experiences will enhance our competitiveness without question.

As I prepare for the next phase of my life and career, I express my gratitude to you for your support and dedication. I encourage you to stay the course. There are no brighter nor more excellent employees anywhere. You are a first-class, first-rate team. Because of you, I leave NASA with a sense of comfort that the future of GRC is in excellent hands.

I shall remember you in the spirit of teamwork you continue to exhibit to the highest degree. I humbly thank you for the opportunity to serve you and I look forward to working with you through the end of this calendar year.

News Notes

LESA MEETING: LESA/IFPTE, Local 28, will hold its next monthly membership meeting on Wednesday, October 12, at noon in the Employee Center, .

THIRD SATURDAY AT VC: On Saturday, October 15, Glenn's Visitor Center (VC) will present "Chemistry—The Joy of Toys" in conjunction with National Chemistry Week and the American Chemical Society, from 9 a.m. to 4 p.m. During 11 a.m. and 1 p.m. presentations, the VC auditorium will be transformed into a junior chemistry laboratory. Other highlights include free photos available in the Picture Yourself in Space photo booth, kids make and take crafts, and plenty of handouts. For more information and reservations for the presentations, call 216–433–9653 or visit http://visit.grc.nasa.gov.

NEW HOURS AT CREDIT UNION: The onsite Century Federal Credit Union has extended its hours. The facility now opens at 8 a.m. (instead of 8:30 a.m.) and remains open until 3:30 p.m. In addition to the new time, the credit union is offering a rate of 4.25 percent for a 12-month certificate of deposit ($500 minimum) that expires on October 17.

DISABILITY AWARENESS MONTH: Motivational speaker Norbert "Nobby" Lewankowki will be the featured speaker for the Disability Awareness Month event to be held October 25, from 10:00 to 11:30 a.m., in the DEB Auditorium. He will speak on the topic "Workers with Disability Ready for Tomorrow's Jobs Today." Point of contact: Deborah Cotleur, 3–3904.

AFGE MEETING: AFGE Local 2128 will hold its next monthly membership meeting on Wednesday, November 2, at 5 p.m., at Denny's Restaurant, 25912 Lorain Road, North Olmsted. All members are encouraged to attend.

FACILITY TOUR: The Propulsion Systems Laboratory, scheduled for November 5, is the last public tour of the 2005-2006 season. Tours are conducted every hour between 10:30 a.m. and 1:30 p.m., require registration, and are only open to U.S. citizens. For further information and to register, call 216–433–9653, or visit http://www.nasa.gov/centers/events/tours.html. (Monthly public tours will resume in spring 2006.)

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Plum Brook Community Information Session

Visitors of all ages are welcome to attend the annual Community Information Session (CIS) on the Decommissioning of Plum Brook Station's closed Reactor Facility on Tuesday, October 18, from 7 to 9 p.m., in the Cedar Point Center at the Bowling Green State University-Firelands campus, One University Drive, Huron, OH. View displays and listen to the update on the progress of decommissioning work and other NASA activities at Plum Brook Station. The Aero Bus, a traveling exhibit on research and environmental programs at Glenn, will also be on site for tours. Light refreshments and limited seating will be available for viewing of several segments of the documentary video on the Reactor Facility entitled, "Of Ashes and Atoms." The quarterly Workgroup meeting preceding this session, held at 5:30 p.m., is also open to the public. The Cedar Point Center is wheelchair accessible. Point of contact: Sally Harrington, 216–433–2037.

"Inquiring" minds want to know

New process improves communications with the public

BY DOREEN B. ZUDELL

You've got mail! While that may be a welcome announcement on your home computer, the flow of e-mails at work can get overwhelming at times. If you get unsolicited e-mail from the public, help has arrived.

To ensure a responsive public communications program and enhance the perception of NASA, each center has designated a Public Inquiries Officer(s) for managing communications from the general public, including letters, e-mails, faxes, and telephone calls.

"NASA has a responsibility to respond to the public," said David DeFelice, Community and Media Relations Office. "Designated officers and a central e-mail address will help us keep the public better informed of NASA's accomplishments."

DeFelice and Cheryl McCallum, BTAS/ Community and Media Relations Office, are Glenn's designated Public Inquiries officers.

McCallum, who also coordinates Glenn's Speakers Bureau and Publications Office, is well versed in responding to public inquires. Almost daily she receives what she calls "Dear NASA" letters from students and adults, asking for publications, lithographs, patches, and other items that reflect NASA's vision and mission. Additionally, McCallum appreciates and relies on employees with specific expertise to assist with technical inquires.

"While the e-mail address, Public-Inquiries@grc.nasa.gov, is the suggested clearinghouse for public inquiries and aligns with the e-Government initiative, this does not mean that employees cannot maintain their own public contacts and answer questions that are in their scope of knowledge," McCallum explained. "However, if you receive inquiries that you are unsure of how to handle, we ask that you forward the request to this address to ensure that the inquiry is handled quickly and accurately."

If employees choose to address the inquiry they are qualified to answer, it would be helpful to courtesy-copy the e-mail address for tracking and metrics purposes. If the inquiry does not appear to fall under NASA's purview, simply forward the communication to notnasa@nasa.gov. E-mails sent to this account will be reviewed and then redirected to the proper agency for appropriate disposition. Remember, never open any e-mail with an attachment from an unknown source.

As NASA plots its course to the Moon, Mars, and beyond, it is vital that the Agency's communications strategies are in place. Glenn's Public Inquiries officers will aid in this mission.

Editor's note: *Public inquiries received via Glenn's public Web portal are answered by the Public Portal Editor Kathy Zona.* ◆

Integrated Financial Management Program changes name

The Integrated Financial Management Program (IFMP) has been renamed the Integrated Enterprise Management Program (IEMP) to reflect the addition of program management and labor distribution.

During an IEMP Town Hall meeting held in September, Glenn's Chief Financial Officer Bruce Ward stressed, "Financial Management is not just the responsibility of the Office of the Chief Financial Officer. It is every employee's responsibility."

The following two new program initiatives impact employees:

Project Management Information Improvement (PMI^2)
This project will modify and standardize the budget structure, capturing financial information and providing the following benefits:

- Provide a consistent and standardized tool for project management reporting and Earned Value Management (EVM) across the Agency
- Allow program and project managers to view detailed costs and obligations associated with a project
- Facilitate hierarchical project reporting

Since IEMP is standardizing the budget structure across the Agency, this will change the composition of the work breakdown structures (WBS) currently used in the IEMP application. However, project managers and supervisors have access to the new WBS numbers, as well as the old WBS numbers for cross-reference purposes.

As stated in a letter from the Administrator, "The completion of all phases of PMI^2 will significantly improve the ability of our Agency to manage its programs and projects along consistent and integrated lines of financial reporting."

Agency Labor Distribution System (ALDS)
ALDS is the centralized system for all centers for labor data and reporting, facilitating standardized Agency-level labor distribution business processes. This will enable consistency and improved data integrity to support full-cost accounting. By fiscal year 2006, ALDS will process labor reports, making them available in the Business Warehouse (BW) application and Workforce Integrated Management System (WIMS).

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NASA aids small business leap to production

BY S. JENISE VERIS

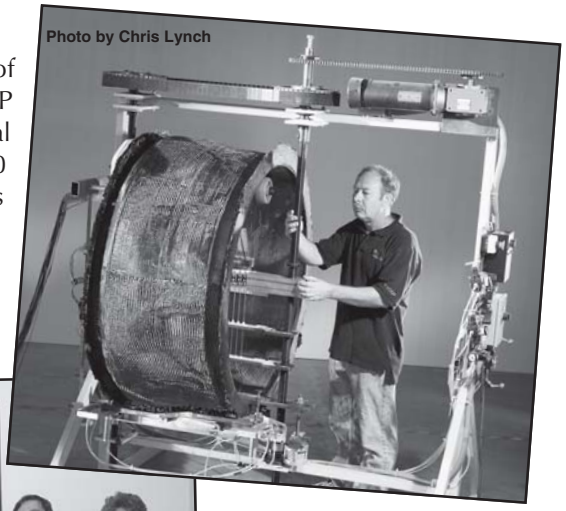
NASA's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs have a rich history of ensuring that the best and most innovative concepts become part of Federal research and development efforts that benefit the Nation. Last year, President Bush issued an Executive Order affirming the importance of the SBIR/STTR programs as a source of Federal support to private sector manufacturing.

"Since inception, SBIR (1983) and STTR (1992), have provided hundreds of opportunities for small, high-technology companies and research institutions to participate in Government-sponsored research and development efforts in key technology areas," explained Dean Bitler, STTR program manager in the Technology Transfer and Partnership Office. "Glenn is fortunate to employ scientists and engineers who are experts in their respective fields, as evidenced by its lead in total number of awards and success stories across the Agency."

The SBIR/STTR programs involve a three-phase funding approach for a small business to adapt or apply their technology towards a specific set of NASA mission-driven needs. The recent success of two Ohio-based companies, A&P Technology, Inc. (Cincinnati), and WebCore Technologies, Inc. (Dayton), highlights NASA's long-term commitment and Glenn's foresight to identify and support these manufacturing technologies. Both support the Aviation Safety goals of NASA's Aeronautics Research missions.

A&P Technology

Dr. Gary Roberts, Polymers Branch, began working with A&P on a Phase I SBIR contract 4 years ago. "We were researching lightweight, affordable composite materials for producing large fan cases in high-bypass jet engines. Composites reinforced with triaxial braided carbon fiber were being considered as a possible solution," he explained. "A&P Technology had invested in new equipment for automated braiding of large-diameter carbon fiber tubes, which could be adapted for our needs."



Above: *WebCore technician inspects a Sandwich Panel Softwall Fan Case.* **Left:** *A&P Technology President Andy Head; Chuck Ruggeri, University of Akron/ LERCIP intern; Glenn's Dr. Roberts; Tim Averbeck, A&P; Wieslaw Binienda, University of Akron; and Pam Schneider, A&P Vice President, Sales; with a braided composite fan case model.*

Progress through Phase I and II of the SBIR program enabled A&P Technology to produce several prototypes that weigh at least 30 percent less than the metal cases currently in service, with potential for reduced fuel consumption. Unique collaborations and in-kind contributions between large and small businesses, government, and universities aided development and delivery of prototype composite fan cases. Performance tests were conducted in Glenn facilities.

Advancements in the manufacturing process merited A&P Technology's recognition as an Ohio Emerging Technology (2004) and as a contributor to a Turning Goals Into Reality award for Glenn's Jet Engine Containment Concepts and Blade-out Simulation Team. A&P Technology, currently in Phase III, is partnered with two U.S. engine manufacturers for potential product applications. In addition, General Electric (GE) recently chose this technology for its GEnx engine fan case.

WebCore Technologies

WebCore made a connection to the SBIR program through NASA's Regional Technology Transfer Center, Great Lakes Industrial Technology Center. WebCore had developed a reliable, damage-tolerant structural sandwich core material called TYCOR®. This fiber-reinforced foam composite material was deemed ideal for "softwall" jet engine fan containment systems.

"We began partnering on a Phase I contract for the Ultra-Safe Propulsion Project under NASA's Aeronautics Enterprise," said Dale Hopkins, Structural Mechanics and Dynamics Branch. "Since then, WebCore has advanced TYCOR® with a 25-to 50-percent weight reduction over metal fan containment systems, while establishing a twofold increase in retained mechanical properties demonstrated in a subscale projectile impact test."

SBIR support to WebCore Technologies has advanced fan case manufacturing. By developing this unique material, WebCore has opened the door to a wider market for other damage-sensitive applications.

WebCore, like A&P Technology, has transitioned to Phase III and has enjoyed considerable success by infusing technology not only into NASA missions but also other Government and non-Government applications, leading to multiple and continued funding sources. WebCore earned Ohio's Emerging Technology Award in 2002 and received additional funding

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Dual track treadmill incorporates virtual reality screen

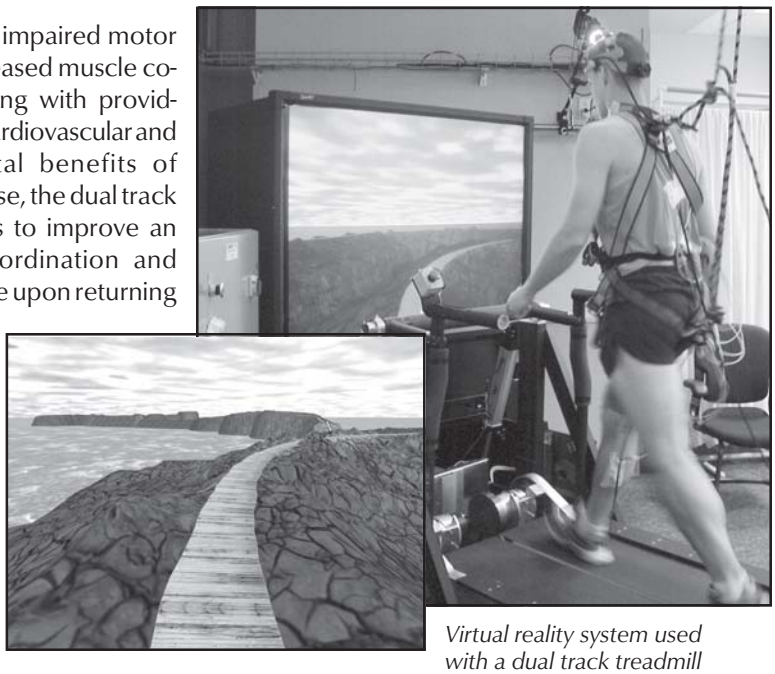
NASA Glenn's Human Health and Performance Project Office has been developing a virtual reality (VR) system to be used in conjunction with a dual track treadmill that will help astronauts maintain balance and coordination after spending time in space. For the past 4 years, Glenn's project team also analyzed data collected from two groups of human test subjects.

The construction and testing of the dual track treadmill has been a collaborative effort between NASA Glenn, the John Glenn Bioengineering Consortium, and the Cleveland Clinic Foundation (CCF). Susan D'Andrea, CCF, is the principal investigator (PI) and manages the program's research, design, construction, and programming. At Glenn, the development of the VR system was led by Co-PI Dr. Jay Horowitz and computer graphics software engineer Phil O'Connor, both of the Computational Science Branch.

The treadmill design is unique because each track can be independently controlled to vary speed, inclination, or height so as to simulate uneven terrain, steps, or even going around corners. The VR system is synchronized with the treadmill to display an environment that corresponds to the motion of the tracks. A computer interface connects to the VR system and the treadmill to maintain a digital communication link between all three devices.

Glenn's VR system is an essential part of the project because it coordinates what you see with what you feel. O'Connor created the software program that generates the visual environment and controls the motion of the treadmill. "I really enjoyed working through the problem-solving challenges. Also, it was a good opportunity to creatively apply graphics, artificial intelligence, and gaming technology to a scientific NASA application," notes O'Connor.

Research studies thus far have indicated that exercise countermeasures like the dual track treadmill will help improve an astronaut's health. During spaceflight, astronauts may experience motion sickness, dizziness, impaired motor skills, and decreased muscle coordination. Along with providing the typical cardiovascular and musculoskeletal benefits of treadmill exercise, the dual track treadmill hopes to improve an astronaut's coordination and sense of balance upon returning to Earth.



Virtual reality system used with a dual track treadmill helps astronauts maintain balance.

According to Dr. Horowitz, an astronaut's ability to reorient his or herself quickly following space travel is critical to long-duration spaceflights to Mars and beyond. For this reason, "countermeasures have become a high priority for NASA in fulfilling the Vision for Space Exploration," he said.

The initial testing phase with humans is now complete. The project team is currently analyzing data, and regular updates are being made to the software and visual display screen. In the future, researchers hope to add the VR system to the treadmill on the International Space Station and partner with CCF in more advanced exercise countermeasures. ◆

This article was written by Emily Groh, ANLX/Exploration Systems Division.

IEMP incorporates program management and labor distribution

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ALDS will also impact the accounting for chargeback, comp/credit time, and annual leave. The future Glenn Labor Charging Policy Manual will establish these guidelines. Because of the new PMI^2 WBS, job order numbers and tasks that are used by the current system will be obsolete. All reporting will be done using the new WBS numbers.

Overview training and job aides are available to all employees. There will also be targeted training for current and new BW users, purchase requisitioners and approvers, and labor analysts. Check the IEMP Web site for more information and available IEMP courses at http://cfo.grc.nasa.gov/ifm/.

"The investments we are making today in this Program [IEMP] are principally aimed at improving how we manage our investments and control the operating costs of the Agency; this new name captures the spirit of the developments now under way in this effort," affirmed Administrator Griffin. ◆

NASA's contributions touted Labor Day weekend

Glenn's Community and Media Relations Office (CMRO), with the support of employees throughout the Center, made the most of opportunities to demonstrate NASA's relevance to the Nation's investment in aeronautics and space during Labor Day weekend.

A record crowd of 115,000 at the Cleveland National Air Show, held at Burke Lakefront Airport, had the chance to view exhibits of current and developing technologies including Oil-Free Turbomachinery and Icing Research, as well as accomplishments surrounding the Return to Flight (RTF) effort. NASA's education tent, featuring a variety of hands-on activities, along with the Mobile Aeronautics Education Laboratory, the AeroSpace Environmental Bus, and Eva the Inflatable Astronaut, added to the family fun and excitement.

"The RTF exhibit was very well received with many visitors expressing their support for the Space Shuttle Program," said Orlando Thompson, Sr., CMRO. "The public learned a lot about NASA's accomplishments, including its efforts in returning the Space Shuttle to flight."

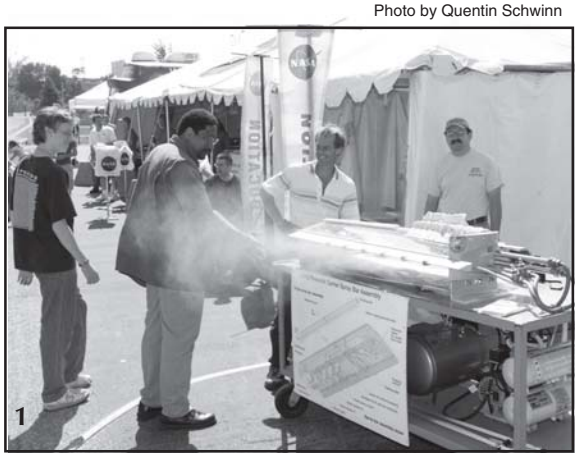
More than 70,000 people could explore NASA in a different light during the inaugural Ingenuity Festival of Art and Technology, which showcased the diverse and creative synergy of the arts and technology communities in Cleveland. NASA's RTF flight simulator workstation and a unique "Feel the Lift" interactive exhibit, complete with wings and fans, drew visitors in to experience the excitement of a space launch and the forces of lift and drag in flight.

In addition to staffing educational and interactive exhibits, two NASA employees joined "Confluence," a modern dance performance that used wind, dance, and flowing fabric to demonstrate the aeronautic states of balance and turbulence. NASA's Tom Benson, Engine Systems Branch, and David DeFelice, Community and Media Relations Office, assisted the DancEvert performers by operating institutional shop fans and leaf blowers to animate wind energies, as illustrated by the flowing fabric.

NASA was also featured in the 11th Congressional District Caucus Labor Day Parade. Glenn staff distributed decals and other NASA giveaways, while accompanying the NASA "Expanding Horizons and Opening Frontiers" shuttle-launch float. Nearly 3,000 residents viewed the parade and later greeted Cleveland Mayor Jane Campbell and Congresswoman Stephanie Tubbs Jones at concluding festivities in Luke Easter Park.

Eva the Inflatable Astronaut traveled to the Galleria to appear on behalf of Glenn during the Jerry Lewis Muscular Dystrophy Association Labor Day Telethon. The downtown Cleveland mall was one of the host sites for the annual event, which was largely attended by families with preschool-aged children. Participating in the telethon provided NASA an opportunity to show support for this important cause and the research necessary to find a cure. ◆

Photo by Quentin Schwinn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***Top to bottom**: (1) John Veneziano, SLI/ Nuclear Technology and Demonstration Projects Office, and Dr. Mark Potapczuk, Icing Branch, demonstrate Icing Spray Bar technology for visitors touring NASA exhibits at the Cleveland Air Show. (2) Mayor Jane Campbell (left, center) admires NASA's shuttle float at the 11th Congressional District Caucus Labor Day Parade with Glenn staff: left to right, Harriet Daniels, Project Control and Support; Gregory Schade, Space Power and Propulsion Technical Branch; Campbell; Robert L. Allen, Security Management and Safeguards Office; Cynthia Calhoun, Risk Management Office; and Mack Thomas, Community and Media Relations Office detailee. (3) The modern dance performance, "Confluence," teaming the DancEvert Troupe and Glenn; and (4) Tom Benson, left, and David DeFelice, with dance lead, Susana Weingarten de Evert.*

Awards and Honors


Dr. Liou

Dr. May-Fun Liou, aerospace engineer in the Engine Systems Branch, was selected winner of the Research Leadership Award to be presented October 22 at the 2005 National Women of Color Conference in Atlanta. Liou was recognized for leadership and technical accomplishments in the areas of high-performance computing, computational fluid dynamics, and for proactive management of a Small Business Innovative Research subtopic entitled, Revolutionary Technologies and Components for Propulsion Systems.


Manzo


Reid

Glenn's Cocha Reid and Michelle Manzo, Electrochemistry Branch, joined coauthor Mike Logan of Langley Research Center in accepting the Society of Automotive Engineers' (SAE) 2004 Charles M. Manley Memorial Medal for their paper entitled "Performance Characterization of a Lithium-Ion Gel Polymer Battery Power Supply System for an Unmanned Aerial Vehicle." The Manley Medal is awarded to the best paper relating to the theory or practice in the design or construction of—or research on—aerospace engines, their parts, components, or accessories presented at a SAE meeting. The award was presented on October 4 during the 2005 SAE AeroTech Congress & Exhibition awards luncheon held at the Gaylord Texan Resort and Convention Center.


Taylor

The American Institute of Aeronautics and Astronautics (AIAA) has selected Shawn Taylor, a member of the Mechanical Components Branch's Seals Team, as the recipient of this year's AIAA Abe M. Zarem Award for Distinguished Achievement in Astronautics. Taylor is recognized for his paper entitled "Evaluation of Material Substitution in Knitted Spring Tubes for Advanced Structural Seals," presented at the AIAA Region III graduate student paper and presentation competition in April. In addition to the Zarem medallion, which will be presented at the 2006 Aerospace Sciences Meeting and Exhibit in Reno, NV, in January, the award includes a travel-expense-free trip to Fukuoka, Japan, compliments of AIAA, to present this research at the 56th International Astronautical Federation Congress this month.

Coauthors Robert Button, Advanced Electrical Systems Branch, and Dr. Zhiqiang Gao, Cleveland State University (CSU), proudly joined Michael Gray, CSU research associate, in accepting the Best Student Paper Award for the 2004 International Energy Conversion Engineering Conference (IECEC) in Providence, RI. The American Institute of Aeronautics and Astronautics' Aerospace Power Systems Technical Committee selected the paper entitled, "Distributed, Masterless Control of Modular DC-DC Converters," which details Gray's work supporting development of NASA's Intelligent Power Systems under a grant with the former Energetics Program.


Button


Dr. Gao


Gray

NASA Technical Advocate of the Year

The Small and Disadvantaged Business Utilization Office at NASA Headquarters named Eric Clark, Photovoltaics and Space Environment Effects Branch, Technical Advocate of the Year. The award was presented during a ceremony honoring NASA's minority contractor, subcontractor, and women-owned business of the year held September 14.


Clark

NASA Administrator Michael Griffin presented Clark with one of three Exceptional Achievement medals for outstanding technical advocacy within the Agency, noting his contributions and innovative approaches with minority and women-owned business. Jeffrey Jackson, Marshall Space Flight Center , and Robert Medina, Dryden Flight Research Center, received the medal for Procurement and Small Business advocacy, respectively.

NASA's Minority Enterprise Development Week observance and honors cap an exceptional year of small business achievements in support of space exploration.

AeroSpace Frontiers is an official publication of Glenn Research Center, National Aeronautics and Space Administration. It is published the first Friday of each month by the Community and Media Relations Office in the interest of the Glenn workforce, retirees, Government officials, business leaders, and the general public. Its circulation is approximately 6700.

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DEADLINES: News items and brief announcements for publication in the November issue is noon, October 14. The deadline for the December issue is noon, November 10. Submit contributions to the editor via e-mail, doreen.zudell@grc.nasa.gov, fax, 216–433–8143, phone 216–433–5317 or 216–433–2888, or MS 3–11. Ideas for news stories are welcome but will be published as space allows. View us online at http://AeroSpaceFrontiers.grc.nasa.gov.

2005 APEX® AWARDS FOR PUBLICATION EXCELLENCE

News Notes

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WOMEN RETIREE LUNCHEON: The next luncheon for Glenn/Lewis female retirees will be Thursday, November 17, noon, at Mapleside Farms Restaurant, 294 Pearl Road, Brunswick. For further information, please contact Kathy Webb, 440–845–5286.

PM CHALLENGE SET: NASA's PM (Project Management) Challenge 2006, the Agency's third annual management conference, will be held March 21 to 22, 2006, in Galveston, TX, near the Johnson Space Center. As a mission-driven organization, NASA must continuously strive for improvement in program and project management practices. By sharing ideas, project practitioners increase their knowledge and enhance mission success with more effective, efficient, and innovative ways to manage programs and projects. PM Challenge 2006 is open to NASA employees and contractors. Find out more at http://pmchallenge.gsfc.nasa.gov.

In Appreciation

To all of you who were so supportive during my mother's illness and to all who gave me so many kind words, cards, messages, and calls after she passed away, I want to say "thank you." You ladies and gentlemen are the true definition of the NASA Family. God bless you and your families.

—Manuel Dominguez

Thank you all for the flowers, cards, and phone calls during my recovery after knee surgery. Thanks also to those who came to visit me in the hospital and at my home. I am so grateful for your thoughtfulness and kindness during this time. It truly meant a lot to me. **—Sandra Foust**

Thank you so very much to all who supported me and my family during the passing of my mother. Your concern, kind words, prayers, flowers, donations, visits, and cards were truly a comfort and blessing to us. The people at NASA Glenn are the best of the best. Thank you.

–Lori (and Mark) Manthey

SBIR successes show Federal support

Continued from page 7

through the State's Technology Action Fund and Third Frontier Programs. WebCore Technologies is a partner in the new Ohio Center for Advanced Power and Propulsion created under the Third Frontier Wright Center of Innovation. This collaboration is expected to create 80,000 new jobs in the propulsion industry over the next 20 years.

To learn more about Glenn's SBIR/STTR Program and other success stories, visit http://sbir.grc.nasa.gov/. ◆

LERCIP Student and Mentors of the Year

The Lewis Educational and Research Collaborative Internship Program (LERCIP) presented its 2005 Student and Mentor of the Year awards during banquets held separately for college and high school interns.

Honorees nominated among 97 college interns include Chris Gruber, University of Notre Dame, Inlet Branch; Michael Kasick, Carnegie Mellon University, Turbine Branch; and Chika Okoro, Florida A&M University, Advanced Metallics Branch. College mentor winners include Susan Oberc, Logistics and Technical Information Division; Dr. Malcolm Stanford, Tribology and Surface Science Branch; and Dennis Stocker, Combustion and Reacting Systems Branch.

Student and mentor honorees from among 57 interns in LERCIP high school programs include: 1)Engineering Technology—Aimee McConnell, Theodore Roosevelt High School, Research Testing Division; and Elizabeth McQuaid, R&D Labs Technical Branch; 2)NASA PLUS–Daniel Rudary, Independence High School, Educational Programs Office; and Kaprice Harris, Office of Chief Counsel; and 3) NASA SHARP–Renee Tischler, Parma High School, Electric Propulsion Division; and Jeremy John, Electric Propulsion Branch.

A special award went to Monica Okon, Cleveland Heights High School, and Christina Sulkowski, Holy Name High School, nominated for a team project in the Fluid Physics and Transport Branch.

The banquets concluded another successful summer internship program sponsored by Glenn's Educational Programs Office. ◆

In Memory

Hubert Allen, 98, who retired in 1970 after 29 years of NACA/NASA service, recently died. Allen was a physicist engineer and worked on fuel systems for the Mercury Space Program.

Herbert Heppler, 80, who retired in 1980 with 29 years of service, recently died. He worked as a supervisory aerospace engineer.

Metzger

Wilbert Metzger, 81, who retired in 1980 after 31 years of Federal service, including time served in the Navy, recently died. The WWII veteran began his NACA/NASA career as an apprentice and became a metal modelmaker serving in the Fabrication Division. Metzger worked on the Brayton Cycle and Ordance Engine.

Raymond Palmer, 69, who retired in 1995, recently died. He worked as an aerospace technologist. He received a NASA Exceptional Service Medal in 1995.

2005 Combined Federal Campaign continues through October 28

If you haven't yet contributed to Glenn's 2005 Combined Federal Campaign (CFC), you might be asking yourself: "Why should I give? CFC doesn't affect me." Now ask yourself these three questions: "Have my children or I been a member of the Boy or Girl Scouts of America? Do I or someone I know suffer from cancer, heart disease, or diabetes? Do I care about animals and children?"

If you answered *yes* to any of these questions, then the CFC *has* affected you. In fact, it is likely that over the years you or someone close to you has utilized the services of several of the 2000 nonprofit agencies listed in the CFC Contributors Guide.

"The 2005 CFC theme, 'You Are the Key,' illustrates one of the great aspects of the CFC: you choose where your donations go by designating the agencies that you feel strongly about," said CFC Chairperson Bernice Beznoska, Project Control and Support Branch. "Last year, the NASA Glenn family gave $411,462 to agencies that provided a variety of services that improved the lives and renewed the hope of millions of people in our city and global community. I'm confident that this year we will exceed our goal of $372,590 and touch millions more lives in a positive way."

Beznoska said that employees are discovering that donating to the 2005 campaign is as easy as accessing their time sheets, thanks to the WebTADS that conveniently includes a button for pledging online. Simply click on the CFC logo on your timesheet and follow the online instructions. Employees can select the agencies from the built-in searchable Contributors Guide.

"The response to online pledging has been wonderful," she said, "and I encourage employees to consider using this quick and easy method of giving."

Since the 2005 CFC kickoff on September 21, employees and retirees have enjoyed a number of activities, including the annual Agency Fair and the popular Autorama/Picnic/Ice Cream Social. These events demonstrated to potential donors that the CFC is a special way to show that Federal employees care about others.

On October 20, the WAVE, 107.3, will hold its weekly Breakfast Break at Glenn, from 8 a.m. to 2 p.m. in Building 15, to help celebrate the CFC Committee's second annual basket raffle As employees enjoy free coffee, doughnuts, and other giveaways, they can purchase tickets for such items as autographs sports memorabilia, hotel getaway specials, and dinner certificates.

"We encourage employees to come out and enjoy this fun and exciting event, and to make their donations no later than October 28," Beznoska said. "Glenn is consistently one of the top donors of the Northeast Ohio CFC, and we want to continue this fine tradition of giving." ◆

National Aeronautics and Space Administration

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